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ABSTRACT

This basic vocational related skills assessment module in electricity is one of sixteen modules designed to help teachers assess and identify some of the areas in which special needs students may encounter learning difficulties. The materials in the module allow for informal assessment in three basic areas: academic skills, motor skills, and vocational interest and awareness. The basic skills assessment includes reading skills, listening skills, using a book to locate information, and mathematics. The reading section offers materials written at two different reading levels: the first paragraph is easy (4-8), while the second paragraph is more difficult (9-12). The motor skills are assessed through teacher observation and recording on a matrices skills checklist. The third area, vocational interest and awareness, is assessed through a vocational awareness questionnaire completed by students. (LRA)

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DESIGN AND IMPLEMENTATION OF AN ASSESSMENT MODEL FOR STUDENTS ENTERING VOCATIONAL EDUCATION PROGRAMS IN THE STATE OF COLORADO

Electricity

BEST COPY AVAILABLE

University of Northern Colorado

July - 1979

Project funded by:

State Board for Community Colleges and Occupational Education

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CE 023 756

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NATIONAL INSTITUTE OF EDUCATION

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DESIGN AND IMPLEMENTATION OF AN ASSESSMENT MODEL FOR STUDENTS ENTERING VOCATIONAL EDUCATION PROGRAMS IN THE STATE OF COLORADO

Each learner should be considered as unique. All students have unique characteristics which are considered by alert teachers in their efforts to foster more effective learning. This is especially true in vocational programs where our opportunities to know each learner are greater than in some other classroom situations.

Douglas Towne
Sydney Wallace

The purpose of this project was to develop materials that could be utilized for informal assessment of students in vocational programs. The materials were then developed into a series of sixteen modules representing the seven service areas of vocational education. These modules will enable teachers to assess and identify some of the areas in which special needs students may encounter learning difficulties.

This project and the resulting modules are based on the assumption that one of the ways that vocational education can provide training "appropriate to the needs and progress of each ... individual," is to assess the needs of each individual. Another assumption is that "modifying" a vocational program may be done in many ways but cannot be done effectively until assessment of student needs has been completed. The modules will provide information that will enable vocational teachers to modify their materials or lessons based on the results of the assessment information.

Information which you obtain from the assessment may be used in the following ways:

grouping of students with similar instructional needs
placement of students in programs
modification of instructional materials
writing goals and objectives for the student
obtaining remedial help
as a model to devise your own materials
writing contracts for behavioral change
giving specific information to supplemental services or support staff for assisstance

Identification of learning problems clarifies the various level of abilities and the learning styles of students. This necessitates individualizing vocational programs and instruction.

The modules include basic academic skill assessment, motor skill assessment, and interest assessment.

The following vocational areas are included in the modules:

1) *Welding*
2) *Sheet Metal*
3) *Agriculture*
4) *Graphic Arts*
5) *Woodworking*
6) *Automotive*
7) *Autobody*
8) *Drafting*
9) *Health Occupations*
10) *World of Work*
11) *Food Preparation*
12) *Child Care*
13) *Distributive Education*
14) *Electricity*
15) *Horticulture*
16) *Business and Office Occupations*

The assessment of student abilities are important for success in the vocational classroom. The basic skills assessment includes Reading Skills, Listening Skills, Using a book to locate information, and Mathematics. The mathematics section covers many of the basic operations and applications of math that is needed in vocational classes.

The reading section offers paragraphs written at two different reading levels; the first paragraph being easy (4-8), the second paragraph more difficult (9-12). Those students who have trouble with both paragraphs will find it difficult to learn through reading.

As a result of the field testing comments, there are two areas which are only included in the module entitled, World of Work. These two areas are "Following Directions" and "Safety Warnings Quiz". They were judged too "easy" for inclusion in all modules. This module was written specifically for students in disadvantaged and handicapped programs.

Materials are color coded for ease of usage and efficiency.

Yellow - *Student Sheets*
White - *Vocational Awareness Questionnaire*
Salmon - *Matrices*
Green - *Teacher Materials*
Gold - *Class Scoring Sheets*

DAILY LIVING COMPETENCIES

PERSONAL CHARACTERISTICS

WORK APTITUDES

MOTOR SKILLS

MATRICES
SKILLS CHECK LISTS

DIRECTIONS TO THE TEACHER:

* This section is designed to assess capabilities that are not easily quantifiable. Therefore, you will use these as observation instruments.
* More than anything else, these are to be used as diagnostic tools to help establish goals and objectives.
* Using the matrices, observe the student over a period of several weeks in several different situations.
* There are many reasons for poor or below average levels of performance. These may include environmental influences and health, i.e., stress, nutrition, physical limitations. The matrices are merely a guide to reflect how well a student is doing in your area.

DIRECTIONS: Please check the level each student is at according to the following scale.

1. poor
2. below average
3. average
4. good
5. very good
6. n/a

STUDENT MATRIX SKILLS CHECK LIST													
DAILY LIVING COMPETENCIES:													
Can give personal information													
Money concepts													
Transportation abilities													
Job seeking skills													
Completes work													
Understands directional terms													
Understands safety rules													
Demonstrates cooperation with others													
Punctuality													
Attendance													

DIRECTIONS: Please check the level each student is at according to the following scale.

1. poor
2. below average
3. average
4. good
5. very good
6. n/a

STUDENT MATRIX SKILLS CHECK LIST														
PERSONAL CHARACTERISTICS:														
Grooming														
Personal Hygiene														
Physical Tolerance Full Workday														
Peer Relationships														
Self Confident														
Works Well Alone														
Works Well in Group														

DIRECTIONS: Please check the level each student is at according to the following scale.

1. poor
2. below average
3. average
4. good
5. very good
6. n/a

STUDENT	MATRIX SKILLS CHECK LIST												
WORK APTITUDES:													
Follows Written Instructions													
Follows Verbal Instructions													
Follows Demonstration													
Retains Instructions													
Improves with Repetition													
Conceptualizes the Problem													
Follows Multi-stepped Instructions													
Uses good judgement													

DIRECTIONS: Please check the level each student is at according to the following scale.

1. poor
2. below average
3. average
4. good
5. very good
6. n/a

STUDENT / MATRIX SKILLS CHECK LIST														
MOTOR SKILLS:														
Perform Manipulative Tasks														
Move Around Objects														
Use Large Tools														
Small Motor-eye-hand Coordination														
Two Hand Coordination														
Use Small Tools														
Finger Dexterity														
Steady Work Pace														
Heavy Lifting														

READING SKILLS

DIRECTIONS TO THE TEACHER:

This instrument is designed to assess how well the student understands written materials. The skills are broken into vocabulary, (Question 1-5), main ideas, (Question 6), details or facts, (Question 7), and inference or logical deduction, (Question 8).

1. Have students read each paragraph and then answer the questions on the following page. The students may refer to the original paragraph while completing the questions. (Time: approximately 15 minutes).
2. Collect all sheets.
3. Correct worksheets.

Vocabulary

a. For each vocabulary word listed (Questions 1-5), the student should leave a definition or synonym that shows an understanding of the word as it is used in the sentence. Score vocabulary questions as one (1) point each. Five (5) is a perfect score; zero (0) means none are correct.

Main Idea

b. In Question Six (6) you will assign a score of 1-5. The score should be based on how completely the student comprehends the paragraph.
   1) little knowledge or comprehension
   2) some grasp of paragraph
   3) fair idea of paragraph's content
   4) good idea of paragraph
   5) description which tells what the whole paragraph is about

Details

c. In Question Seven (7) a full score, five (5) points, should be based on whether the student puts down the two important facts.
   1) any one fact in the paragraph
   2) any two facts in the paragraph
   3) one fact that answers the statement well
   4) one fact that answers the statement well and any one that is in the paragraph
   5) Two facts that answer the statement well

Inference

d. In Question Eight (8) you are looking for an understanding that goes beyond what is in the paragraph.

   1) any attempt to answer

   2) any answer that even addresses the question

   3) some idea of an extension of the basic knowledge

   4) 5) a good answer which shows an understanding of the implications of the question.

   EXAMPLE: A few words which describe what a good title for the paragraph is about would receive a score of four (4).

4. Total the scores (1-8), for each paragraph.

EXAMPLE:

	Paragraph 1		Paragraph 2		TOTAL
Vocabulary	_____	+	_____	=	_____
Main Idea	_____	+	_____	=	_____
Details	_____	+	_____	=	_____
Inference	_____	+	_____	=	_____

5. Enter the score from each area and the total on the class scoring sheet.

6. Paragraph one was chosen for student who have lower reading levels. Paragraph two was chosen for students who read at the high school level.

ELECTRICITY
READING SKILLS - I

READ THIS PARAGRAPH:

A transformer is a device that changes VOLTAGES. The voltage put into a transformer is either STEPPED UP or STEPPED DOWN. A transformer works on ALTERNATING current. A transformer may also be used to step up or step down PULSATING direct current.

ANSWER QUESTIONS ON THE NEXT PAGE

Rex Miller, Basic Electricity, Charles A. Bennett Company, Inc., Peoria, Illinois, 1978.

NAME_____

ELECTRICITY
READING SKILLS - I

DIRECTIONS TO STUDENT:
Please tell what the following words mean as they are used in the previous paragraph.

1. VOLTAGE_____

2. STEPPED UP_____

3. STEPPED DOWN_____

4. ALTERNATING_____

5. PULSATING_____

VOCABULARY_____
(0-5)

6. What is this paragraph about?_____

MAIN IDEA_____
(1-5)

7. Name two ways a transformer works:
(1)_____
(2)_____

DETAILS_____
(1-5)

8. Why are transformers needed?_____

INFERENCE_____
(1-5)

TOTAL SCORE_____

ELECTRICITY
READING SKILLS - II

READ THIS PARAGRAPH:

With the ADVENT of the 3-way switch, the concept of MULTI-POINT switching gradually broadened into the many conveniences and economics of modern AUTOMATED lighting controls. A single switch at more than one point can control a single lighting FIXTURE, or several switches at one point can control many lighting fixtures at various locations. These may be either on the same or on different BRANCH circuits.

ANSWER QUESTIONS ON THE NEXT PAGE

Rex Miller, Industrial Electricity, Charles A. Bennett Company, Inc., Peoria, Illinois, 1978.

NAME_____

ELECTRICITY
READING SKILLS - II

DIRECTIONS TO STUDENT:

Please tell what the following words mean as they are used in the previous paragraph:

1. ADVENT_____

2. MULTI-POINT_____

3. AUTOMATED_____

4. FIXTURE_____

5. BRANCH_____

VOCABULARY_____
(0-5)

6. What is this paragraph about?_____

MAIN IDEA_____
(1-5)

7. Name two types of modern controls:
   (1)_____
   (2)_____

DETAILS_____
(1-5)

8. Why would you need different switches?_____

INFERENCE_____
(1-5)

TOTAL SCORE_____

LISTENING SKILLS

DIRECTIONS TO THE TEACHER:

This test is designed to indicate how well your students use their auditory skills. They will be listening to a passage that is read two times. Then they will fill in the missing words on the answer sheet.

In order to utilize the Listening Skills Unit, the listening skills paragraph needs to be taped or read to the students by you.

Please read the directions on the student sheets to the class. The students may write on their answer sheets at any time during the two readings. The students should be asked to read the test sheet before listening to the tape.

GRADING:

The number correct is the total number of correct words filled in the blanks. Please accept reasonable substitutes for the words. Overlook poor spelling.

ELECTRICITY
LISTENING SKILLS

ANSWERS

How D-C Motor commutator switching works

1. Switching eliminates current from a loop.
2. The current passes through the neutral plane with little arching.
3. A brush short circuits that loop.
4. The potential difference across the loop is also at a minimum.
5. When the loop is short circuited the make and break operations involve points of near equal potential.
6. Therefore the commutation takes place with a minimum of arching and sparking.
7. The torque is lost only for the instant the loop is in neutral.
8. The motor performs at its highest possible operating speed.

ELECTRICITY
LISTENING SKILLS

In practical D-C motors commutator switching eliminates current from a loop passing through the neutral plane with minimum arching. In part this is accomplished by using a brush to short circuit that loop for the instant it lies within the neutral plane. Because the loop is in the neutral plane during commutation and there is minimum or no interaction with the field flux, the potential difference across the loop is also at a minimum. This means that when the brush short circuits the loop in the neutral plane and then reestablishes the cirucit with current flow in the new direction, the make and break operations involve points of near equal potential, so that commutation takes place with a minimum of arching and sparking. By keeping the shorting period to an absolute minimum, we insure that the torque is lost only for the instant the loop is in neutral and that the motor performs at its highest possible operating speed.

PARAGRAPH TO BE READ OR TAPED

LISTENING SKILLS

DIRECTIONS TO STUDENT:

You will hear a passage read from the book just mentioned. The passage will be read once quickly and then again slowly.
Listen carefully to the passage each time it is read. As you listen to the passage being read fill in the blanks. You will fill in the facts that you hear on your answer sheet.

READ YOUR SHEET THROUGH BEFORE LISTENING TO THE TAPE.

NAME_____

ELECTRICITY
LISTENING SKILLS - Student Worksheet

How D-C Motor commutator switching works

1. Switching eliminates _____ from a loop.
2. The current passes through the neutral plane with little _____.
3. A brush _____ circuits that loop.
4. The potential _____ across the loop is also at a _____.
5. When the loop is short circuited the make and break operations involve points of near equal _____.
6. Therefore the _____ takes place with a minimum of arcing and sparking.
7. The _____ is lost only for the instant the loop is in neutral.
8. The motor performs at its _____ possible operating _____.

PARTS OF A BOOK

DIRECTIONS TO THE TEACHER:

Being able to locate information in a book is an important skill in most vocational areas. This test is designed to indicate the student's information locating ability in using a TABLE OF CONTENTS and an INDEX.

The student will use a table of contents and an index from your vocational area to answer five questions for each of the two areas. CAUTION students that the Table of Contents and/or Index may have more than one page. Ask students to check all pages before writing down their answers.

SCORING:

Correct the two parts and enter the total score on the class-scoring sheet.

Example:

Score - Table of Contents . . . . . _____

Score - Index . . . . . + _____

(0-10) _____

ELECTRICITY
PARTS OF A BOOK

ANSWERS:

Table of Contents

1. Page (s) 444
2. Page (s) 434
3. Page (s) 269
4. Page (s) 269
5. Page (s) 370

Index

1. Page (s) 65-74
2. Page (s) 149-155
3. Page (s) 159
4. Page (s) 44,45
5. Page (s) 192,193

PARTS OF A BOOK

DIRECTIONS TO THE STUDENT:

There will be two parts to this section.

Using a Table of Contents
Using an Index

*Answer the Table of Contents questions by using the Table of Contents that follows.

*Answer the Index questions by using the Index that follows.

NAME_____

ELECTRICITY
PARTS OF A BOOK

TABLE OF CONTENTS:

Using the table of contents answer the following questions.

On which page(s) would you find:

1. DC motors?	1. Page(s)_____
2. Generators and motors?	2. Page(s)_____
3. Romex wire?	3. Page(s)_____
4. Installing devices?	4. Page(s)_____
5. Farm lighting?	5. Page(s)_____

ELECTRICITY

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Rex Miller, Industrial Electricity, Charles A. Bennett Company, Inc., 1978.

NAME_____

ELECTRICITY
PARTS OF A BOOK

INDEX:

Using the index answer the following questions.

On which page(s) would you find:

1. Nuclear power plants?	1. Page(s)_____
2. Safety devices?	2. Page(s)_____
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SOURCE: Miller, Rex, Industrial Electricity, Chas. A. Bennett Co., Inc., 1978.

MATHEMATICS TEST

DIRECTIONS TO THE TEACHER:

This test is designed to assess skill areas that might be needed in a vocational class.

The skills cross vocational areas.

The first ten questions comprise a basic skills assessment. The rest of the test uses various kinds of skills in diverse mathematical areas.

A student should not spend too much time on any one problem. He/she should be given extra time if necessary.

1. Allow one hour for students to complete this test.
2. Score the answers on the students' test.
3. Subtract the number missed from forty-two (42).
4. Enter the score on the class scoring sheet.

It is easy to tell which areas a student is weak in by referring to the test itself.

This is important when there are only a few wrong.

Answer Key

1a. 13

1b. 1373

2a. 6

2b. 1622

3a. 4/5

3b. 10 7/8

4a. 4/7

4b. 1 6/8, 1 3/4

5a. 17.67

5b. 3 ft. 5 in.

5c. 2.87

5d. 75 centimeters

6a. 36

6b. 131274

7a. 5

7b. 107

8a. 17 ½

8b. 63/16

9a. 25

9b. 61/15

10a. .0030

10b. 3.774

10c. 8.1

10d. .7

11. 0.41

12. 5280 square feet

13. 0.910, 09.10, 091.0, 0910

14. $180

15. $342.45

16. 2 feet 3 inches

17. $48.80

18a. 3/4

18b. 4 1/8

18c. 5 ⅛

19d. 1 1/8

19e. 7/8

19f. 1 3/4

20. ½ cup

21. 4 cups

22. 7:00

23. 7 hours

24. $2.50

25. 160 meters

26. 2 hours

MATHEMATICS

DIRECTIONS TO THE STUDENT:

*TRY EACH QUESTION.

*DO NOT SPEND A LONG TIME ON ANY ONE QUESTION.

*USE THIS SHEET TO WORK OUT ANSWERS.

*ASK FOR AN EXTRA SHEET OF PAPER IF YOU NEED IT.

* DO NOT WORRY IF SOME QUESTIONS ARE TOO HARD FOR YOU.

NAME_____

MATHEMATICS TESTING SECTION

DIRECTIONS TO STUDENT:

Solve each problem and put answer in the space provided. Don't spend alot of time on any one problem.

ANSWERS

1a. $\begin{array}{r} 6 \\ +7 \\ \hline \end{array}$ b. $\begin{array}{r} 782 \\ +591 \\ \hline \end{array}$

1a. _____

1b. _____

2a. $\begin{array}{r} 18 \\ -12 \\ \hline \end{array}$ b. $\begin{array}{r} 4001 \\ -2379 \\ \hline \end{array}$

2a. _____

2b. _____

3a. $\begin{array}{r} 1/5 \\ +3/5 \\ \hline \end{array}$ b. $\begin{array}{r} 7\ \frac{1}{2} \\ +3\ 3/8 \\ \hline \end{array}$

3a. _____

3b. _____

4a. $\begin{array}{r} 5/7 \\ -1/7 \\ \hline \end{array}$ b. $\begin{array}{r} 3\ 5/8 \\ -1\ 7/8 \\ \hline \end{array}$

4a. _____

4b. _____

5a. Add: 14.6 to 3.07

b. Add: $\begin{array}{r} 1\text{ft.}8\text{in.} \\ 1\text{ft.}9\text{in.} \\ \hline \end{array}$

5a. _____

5b. _____

NAME _____

Mathematics Testing Section

ANSWERS

5c. Subtract: 15.63 from 18.5

d. Subtract:
3 meters 3.0 CM
− 2 meters 55 CM

5c. _____

5d. _____

6a. 12
x 3

b. 429
x306

6a. _____

6b. _____

7a. $5\overline{)25}$

b. $26\overline{)2782}$

7a. _____

7b. _____

8a. 7 x 2 ½

b. 1 3/4 x 2 ¼

8a. _____

8b. _____

9a. 6 ¼ ÷ ¼

b. 7 5/8 ÷ 1 7/8

9a. _____

9b. _____

10a. .06
x.05

b. 10.2
x .37

10a. _____

10b. _____

10c. _____

10d. _____

c. $8\overline{)64.8}$

d. $2.50\overline{)17.5}$

NAME_____

Mathematics Testing Section

11. Write forty-one hundredths as a decimal.

ANSWER_____

12. What is the bottom floor area of a house which has the following dimensions: 96 ft. long, 55 ft. wide?

ANSWER_____

13. Arrange the following numbers from the smallest to the largest.

0910. 9.910 091.0 09.10

ANSWER_____

14. As an apprentice you are paid $3.93 an hour. For a 50 week year you work 40 hours each week. What is your yearly income?

ANSWER_____

15. Four (4) apprentice machinists worked 7½ hours each day for $3.93 an hour. Five master electricians worked 6 3/4 hours each day at $9.75 an hour. How much must the contractor pay in total wages for the week?

ANSWER_____

16. Three pieces of pipe, 2 feet 7 inches long are cut from a 10 foot length. How much is left?

ANSWER_____

NAME_____

Mathematics Testing Section

17. In 5 workdays, a welder earns $50, $55, $42, $65, and $32. What is the average earning per day.

ANSWER_____

18. Reading <u>one-eighth rule</u> below, use the drawing below and give the reading of the indicated points.

a. Reading at point C _____

b. Reading at point K _____

c. Reading at point M _____

19 Find the distance between the following letters. (BE SURE TO GIVE ANSWERS IN LOWEST TERMS). Show your work.

d. A to D _____

e. J to L _____

f. I to M _____

20. ⅛ cup + ⅛ cup = _____

ANSWER_____

NAME_____

Mathematics Testing Section

21. How many cups in a quart?

ANSWER_____

22. If John starts baking a cake at 5:00 and the cake takes one hour to bake, at what time will it be finished?

ANSWER_____

23. If Mary and Jane start a project at 9:00 a.m. and need to finish it before 12:30 p.m. what is the total amount of time they have to do it?

ANSWER_____

24. Sue completes an oil change and will also do a lube job on the car. The oil change should take 15 minutes and the lube will also take 15 minutes. If Sue makes $5.00 an hour, how much will she make for these two jobs?

ANSWER_____

25. A field is 30 meters wide and 50 meters long. How many meters of fence will it take to go around the outside of the field?

ANSWER_____

26. You work 40 hours a week. You spend 5% of the time doing clean-up work. How much time is this per week?

ANSWER_____

NAME_____

VOCATIONAL AWARENESS QUESTIONNAIRE

1. Name 2 jobs that you think you could do right now, without any training:
   1._____
   2._____
2. Name 2 jobs that you would like to do, if you had the training:
   1._____
   2._____
3. How much money do you think you will make on your first job?
   _____per hour _____per week
4. What job would you like to have 5 years from now?
   _____
5. Would you like to work:
   Inside_____
   Outside_____
6. Would you like to work:
   With other people_____
   By yourself_____
7. Would you do non-clean work?
   Yes, I would_____
   No, I won't_____
8. Have you ever worked and received a paycheck? Yes_____ No_____
9. What kind of work did you do? _____
10. What kind of work does your parent or guardian do?
    Father_____ Mother_____
    Guardian_____
11. Do you have a driver's license? Yes_____ No_____
12. Name any hobbies or interests you have. _____
    _____
13. Which kind of work would you like better? (CHECK ONE (1)).
    _____One with new things to learn each week.
    _____One where you could learn only one or two things well.

_____

Adapted from: St. Louis Special School District

CLASS SCORING SHEET

DIRECTIONS TO THE TEACHER:

1. Enter all scores on to the class scoring sheet for each student in your class.

2. Circle or highlight all scores below 50% of total in each section.

3. You can use the results to:

   a. Locate areas of weakness that may need to be taught in the classroom.

   b. Group students for extra help.

   c. Refer students for help or support services.

   d. Prepare lessons and tests.

   e. Set individual and class goals.

   f. Place students in vocational programs.

CLASS SCORING SHEET

STUDENT	Skill Area	Vocabulary	Main Idea	Details	Inference	Reading Skills Total Score		Listening Skills		Parts of Book		Following Directions (World of Work ONLY)		Safety Words Quiz (World of Work ONLY)		Mathematics